FOODS AND BEVERAGES
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A.D. 1870, 21st JANUARY. N° 184.

UNITED STATES PATENT NO. 97.085

Preserving Bread.

LETTERS PATENT to William Edward Gedge, of the Firm of John Gedge and Son, of No. 11, Wellington Street, Strand, in the County of Middlesex, Patent Agent, for the Invention of "AN IMPROVED PROCESS FOR PRESERVING BREAD IN A REDUCED BULK."—A communication from abroad by Jean Joseph Auguste Mouriés, of 37, Boulevard Bonne Nouvelle, Paris, France.

Sealed the 15th July 1870, and dated the 21st January 1870.

PROVISIONAL SPECIFICATION left by the said William Edward Gedge at the Office of the Commissioners of Patents, with his Petition, on the 21st January 1870.

I, WILLIAM EDWARD GEDGE, of the Firm of John Gedge and Son, of No. 11, Wellington Street, Strand, in the County of Middlesex, Patent Agent, do hereby declare the nature of the said Invention for "AN IMPROVED PROCESS FOR PRESERVING BREAD IN A REDUCED BULK," a communication to me from abroad by Jean Joseph Auguste Mouriés, of 37, Boulevard Bonne Nouvelle, Paris, France, to be as follows:—

Bread holds the first rank amongst the alimentary products supplied to us by the vegetable kingdom. This superiority is due 1°, to the

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elementary composition of corn, which contains various substances, some capable of transformation into blood and organized tissues (gluten, albumen, caseine,), the others capable of sustaining and of producing animal heat (starch, dextrine, glucose, and fat). 2°, to the various mechanical and chemical operations to which wheat is submitted before its transformation into bread. These operations are the grinding, the bolting, the kneading, the fermentation, and the baking, and they aid the functions of the organs of nutrition by eliminating inert matters and increasing the digestibility of the parts fit for sustaining animal life. Fermentation plays a very important part in bread making; it occasions a disengagement of carbonic acid, which raises the dough and produces in the bread numerous openings facilitating the baking and rendering the crumb lighter. This operation requires great care in order to obtain an aliment agreable to the taste and easy of digestion. Unfermented bread is heavy, the fluids of the mouth and of the ossophagus and the gastric juices penetrate it but slowly, and therefore the work of decomposition that takes place in the stomach is laborious. Bread by reason of the water which it contains will only keep for a few days, it is of large bulk compared with the quantity of nutritious matter which it contains, and loses its form when packed close for carriage. Bread making requires a considerable plant, which a campaigning army exposed to frequent and unforeseen movements cannot encumber itself with, and this is also the case in maritime voyages and caravan journeys. This precious food is in such cases replaced by biscuit which is a very firm paste, unfermented, flattened, and cut into cakes, which lose in baking and pressing not only the water which has served for the kneading but also a part of the vegetation water of the flour. This product is not cumbersome, is easily carried, and preserves for a length of time, but it only imperfectly replaces bread, it is very hard, difficult to masticate, does not become thoroughly impregnated with saliva, and fatigues the throat, it digests badly, and in certain cases its prolonged use may produce gastric disorders, further biscuit does not soak well and must be broken into small pieces to make soup.

These considerations led the Inventor of the process the subject of this Invention to seek a means of dispensing with biscuit while preserving bread as the staple food of soldiers, sailors, and travellers.

Starting from the principle that organic matters decompose under the influence of water and heat, the following was the problem to be solved.

1°, render bread susceptible of long preservation by eliminating the water which it contains without causing it to lose its alimentary properties; 2°, reduce its volume by compression.

A satisfactory solution of this problem was not arrived at without many experiments, nevertheless the the system of preparation adopted is of the simplest, it is as follows:—Choose well made and well baked bread and expose it until complete siccity to dry currents of air. The evaporation should be slow in order that the bread may not crack. The duration of the desiccation varies from 8 to 15 days, it is dependent upon the size of the loaves and the drying arrangement adopted. If the bread were compressed in the state in which it is left by the desiccation it would break, and to prevent this it must before being pressed be submitted during 4 or 5 minutes to a heat of from 234 to 424 degrees "Farenheit" (150 to 200 degrees centigrade) in a stove filled with steam. To effect this operation the bread is arranged in layers separated by iron plates which form moulds in which the bread will assume the shape and size previously determined upon. These layers are loaded upon a cast iron carriage running upon rails, and thus introduced into the stove, which is immediately closed, in a few minutes the bread becomes soft although it will have absorbed but a very small quantity of water the load or batch is then withdrawn and pushed by means of a carriage between two pressing plates in order to be compressed. Any press will serve, but as the pressure should be rapid and powerful the hydraulic press is the best. The bread should remain in the press for 24 hours, it may then be removed, is dry and cold and will preserve the shape which has been given to it.

Bread thus prepared should be put in cases to preserve it from the attacks of insects, and should be stored in places free from damp, it may thus be preserved for several years. This compressed bread has a nice colour, the teeth masticate it without effort, the fluids of the mouth penetrate it rapidly, it has an agreable taste and reaches the stomach without fatiguing the ingestion canals, it digests well and a piece of 3 oz. in weight thrown into broth will absorb in 3 or 4 minutes 15 ozs. of liquid and swell considerably.

Gedge's Improved Process for Preserving Bread.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said William Edward Gedge in the Great Seal Patent Office on the 16th July 1870.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, WILLIAM EDWARD GEDGE, of the Firm of John Gedge and Son, of No. 11, Wellington Street, Strand, in the County of Middlesex, Patent Agent, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-first day of January, in the year of our Lord One thousand eight hundred and seventy, in the thirty-third year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said William Edward Gedge, Her special licence that I, the said William Edward Gedge, my executors, administrators, and assigns, or such others as I, the said William Edward Gedge, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "AN IMPROVED PROCESS FOR PRESERVING BREAD IN A REDUCED BULK," a communication to me from abroad by Jean Joseph Auguste Mouriés, of 37, Boulevard Bonne Nouvelle, Paris, France, upon the condition (amongst others) that I, the said William Edward Gedge, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immedately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said William Edward Gedge, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Bread holds the first rank amongst the alimentary products supplied to us by the vegetable kingdom. This superiority is due, 1°, to the elementary composition of corn, which contains various substances, some capable of transformation into blood and organized tissues (gluten,

albumen, caseine, and salts), the other capable of sustaining and of producing animal heat (starch, dextrine, glucose, and fat). 2°, to the various mechanical and chemical operations to which wheat is submitted before its transformation into bread. These operations are the cleaning, the grinding, the bolting, the kneading, the fermentation, and the baking, and they aid the functions of the organs of nutrition by eliminating inert matters and increasing the digestibility of the parts fit for sustaining animal life. Fermentation plays a very important part in bread making. It occasions a disengagement of carbonic acid, which raises the dough and produces in the bread numerous openings facilitating the baking, and rendering the crumb lighter. This operation requires great care in order to obtain an aliment agreable to the taste and easy of digestion. Unfermented bread is heavy, the fluids of the mouth and of the ossophagus and the gastric juices penetrate it but slowly, and therefore the work of decomposition that takes place in the stomach is laborious. Bread by reason of the water which it contains will only keep for a few days, it is of large bulk compared with the quantity of nutritious matter which it contains, and loses its form when packed close for carriage. Bread making requires a considerable plant which a campaigning army exposed to frequent and unforeseen movements cannot encumber itself with, and this is also the case in maritime voyages and caravan journeys. This precious food is in such cases replaced by biscuit, which is a very firm paste, unfermented, flattened, and cut into cakes, which lose in baking and pressing not only the water which has served for the kneading but also a part of the vegetation water of the flour. This product is not cumbersome, is easily carried, and preserves for a length of time, but it only imperfectly replaces bread, it is very hard, difficult to masticate, does not become thoroughly impregnated with saliva and fatigues the throat, it digests badly, and in certain cases its prolonged use may produce gastric disorders, further biscuit does not soak well and must be broken into small pieces to make soup.

These considerations have led the Inventor of the process the subject of this Invention to seek a means of dispensing with biscuit while preserving bread as the staple food of soldiers, sailors, and travellers.

Starting from the principle that organic matters decompose under the influence of water and heat, the following was the problem to be solved. 1°, render bread susceptible of long preservation by eliminating the water

which it contains without causing it to lose its alimentary properties; 2°, reduce its volume by compression.

A satisfactory solution of this problem was not arrived at without many experiments, nevertheless the system of preparation adopted is of the simplest. The process the subject of this Invention is as follows :— Choose well made and well baked bread and expose it until complete siccity to dry currents of air. The evaporation should be slow in order that the bread may not crack. The duration of the desiccation varies from 8 to 15 days, it is dependent upon the size of the loaves and the drying arrangement adopted. If the bread were compressed in the state in which it is left by the desiccation it would break, and to prevent this it must before being pressed be submitted for a few minutes to a heat of at least 148 degrees "Farenheit" (100 degrees "centigrade"), in a stove filled with steam. The bread then becomes very soft and elastic although it has absorbed but a very small quantity (about two per cent.) of water. It is then placed for two or three minutes in an oven heated to about 232 degrees "Farenheit" (150 "centigrade") to thoroughly dry the outside of the crust. On withdrawing the bread from the oven it is placed on plates forming moulds in which it will assume the shape and size previously fixed. These plates are submitted to the rapid and forcible action of any kind of press. When the bread is cold it is withdrawn from the mould, is dry, and will preserve the form given to it. After being shifted about for a few days it should be put in cases to preserve it from the attack of insects, and should be stored in places free from damp, it will thus keep good for several years. This compressed bread has a nice color, it breaks vitreously, the teeth masticate it without effort, the fluids of the mouth penetrate it rapidly, it has an agreable taste, and reaches the stomach without fatiguing the ingestion canals, it digests well and a piece of 3 oz. in weight thrown into broth will absorb in 3 or 4 minutes 15 ozs. of liquid and swell considerably, the soup being all that can be desired. The density of the bread is 0·5, if this degree is exceeded the bread will be too hard.

Having now described and ascertained the nature of the said Invention I would have it understood that no particular apparatus is claimed, but such apparatus is used as may be found suitable for any part of the process, and that I claim as the Invention secured to me by the herein-before in part recited Letters Patent, the process of preparing bread

by submitting it firstly to a slow drying, then to momentary contact with steam, succeeded by a momentary drying, and finally to a powerful compression, substantially as and for the purpose herein-before set forth.

In witness whereof, I, the said William Edward Gedge, have hereunto set my hand and seal, this Fifteenth day of July, in the year of our Lord One thousand eight hundred and seventy.

W. E. GEDGE. (L.S.)

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